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## (54) Speed controller

(57) A vehicle speed controller including a Bowden cable arrangement 11, 15, the inner member 11a of which is connected at one end to an accelerator 12 and at the other end to a throttle 13 of the vehicle engine so that the throttle is moved in response to movement of the accelerator. The control includes a vehicle speed sensor arrangement 22, 23 and an actuator 21, the output member 19 of which is associated with the Bowden cable inner member 11a via a pulley 18 or a lever (28, Fig. 2) to move said throttle 13 in response to a signal from said sensor arrangement 22, 23. In a fuel injection engine the end of the inner member 11a remote from the accelerator 12 is connected to a member controlling fuel supply to the engine.

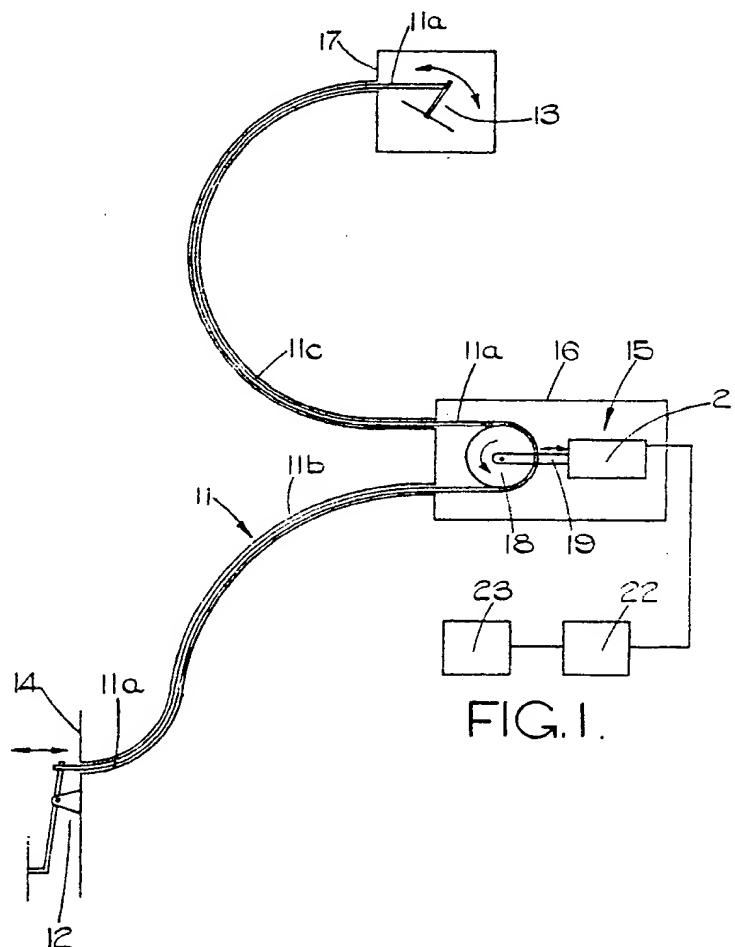
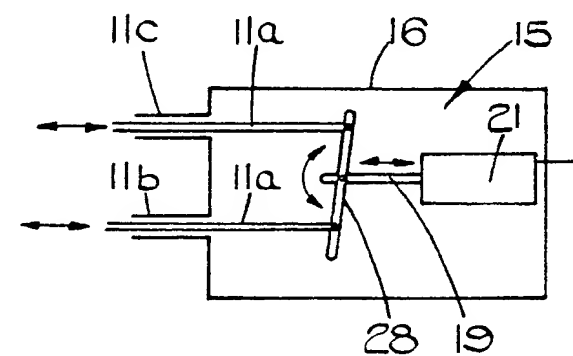
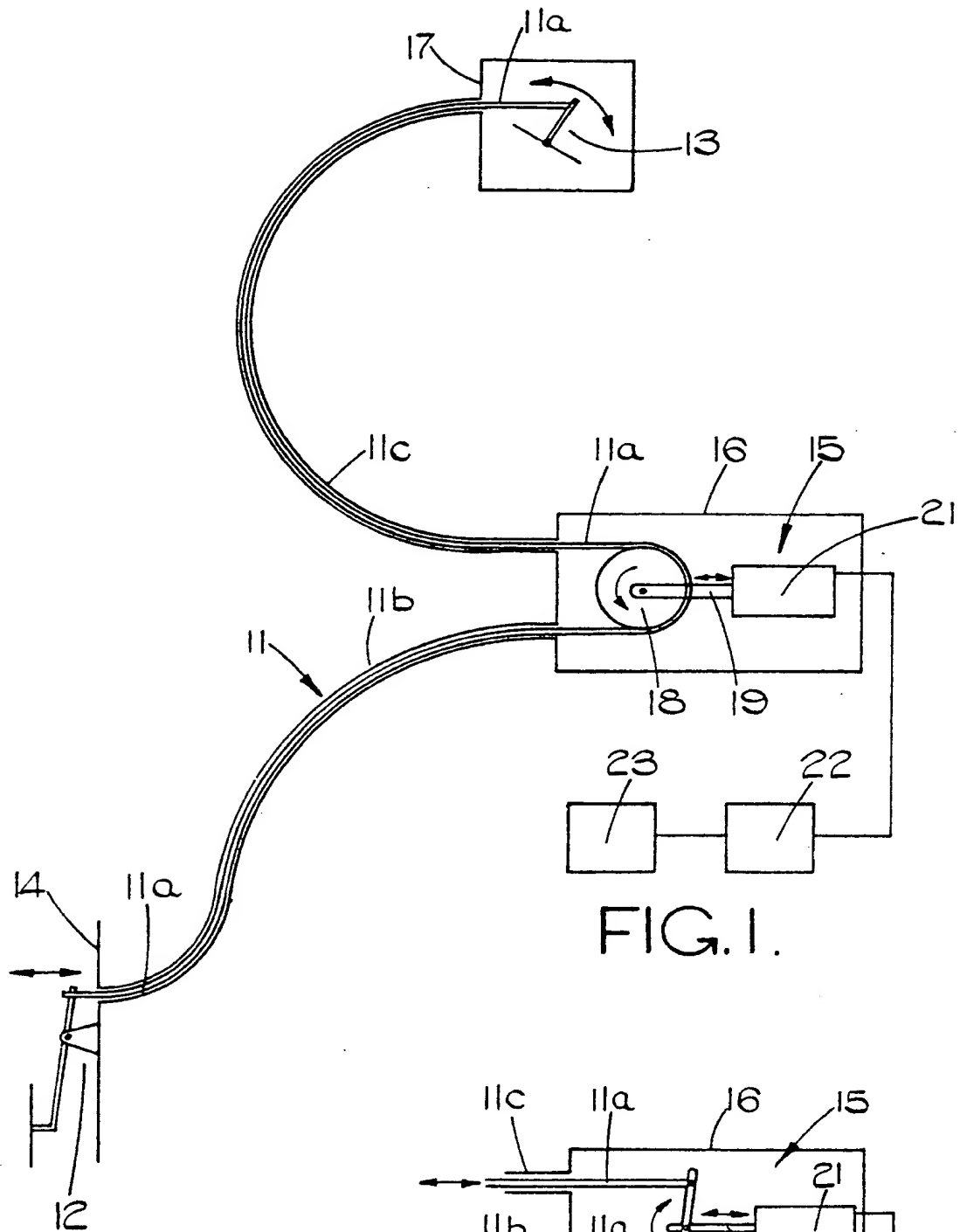


FIG. 1.



# **SPECIFICATION** **Vehicle Speed Controller**

This invention relates to a vehicle speed controller of the kind wherein an actuator is operated in accordance with a signal received from a speed sensor, in response to the vehicle exceeding a predetermined speed, the actuator serving to reduce the throttle opening, or its equivalent, of the prime mover driving the vehicle.

The invention has particular reference to vehicles wherein the prime mover is an internal combustion engine and in such arrangements the engine may be carburettor controlled or may be provided with a fuel injection system. The terms "throttle" and "throttle opening" will be clearly understood when used in relation to an engine having a carburettor. When used in relation to a fuel injected engine they are to be understood as representing the means whereby the quantity of fuel supplied to the engine is controlled. Furthermore, should the terms be construed in relation to vehicles where the prime mover is not an internal combustion engine then they should be construed as references to being means for controlling the speed of operation of the prime mover.

Controllers of the kind specified above are known in speed limiting arrangements for example of the kind shown in French Patent 2451286. The arrangement disclosed in French Patent 2451286 suffers from a number of disadvantages, including the lack of a direct connection from the accelerator control of the vehicle to the throttle of the vehicle.

It is an object of the present invention to provide a vehicle speed controller wherein the aforementioned problems are minimised.

A vehicle speed controller according to the invention includes a Bowden cable arrangement, the inner member of which is connected at one end to the accelerator control of the vehicle and at the other end to the throttle of the prime mover of the vehicle so that the throttle is moved in response to movement of the accelerator control, a vehicle speed sensor arrangement and an actuator, the output member of which is associated with said cable inner member and is caused to move, and in so doing by way of said cable inner member to move said throttle, in response to a signal received from said sensor arrangement.

Preferably said output member is so associated with said inner member that provided that the accelerator control is stationary the movement ratio between the output member and the throttle exceeds 1:1 whereby the throttle moves further than the output member of the actuator for a given movement of the output member.

A further disadvantage of known arrangement such as is shown in French Patent 2451286 is that the actuator output member is directly coupled to the throttle and so needs to have a long and thus relatively slow operating stroke. It is an object of preferred embodiments of this invention to obviate this disadvantage.

Preferably said actuator output member is coupled to the Bowden cable arrangement by

means including a pulley around which the Bowden cable inner member extends between the accelerator and the throttle, said movement ratio when the accelerator pedal is held against movement in use being 2:1.

Alternatively said Bowden cable arrangement comprises a pair of Bowden cable parts and there is provided a lever pivotally connected intermediate its ends to the actuator output member, a first of said Bowden cable parts having its inner member coupled in use to the accelerator at one end and at its other end to one end of said lever, and the second of said Bowden cable parts having its inner member connected at one end, in use, to the throttle, and its other end connected to the other end of said lever.

One example of the present invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a diagrammatic representation of a vehicle speed controller; and

Figure 2 illustrates a modification of part of the controller of Figure 1.

Referring first to Figure 1 of the drawings, the speed controller includes a Bowden cable 11, the inner member 11a of which has one end rigidly connected to the accelerator pedal 12 of the vehicle utilizing the speed controller, and the opposite end rigidly connected to the throttle 13 of the carburettor of the internal combustion engine driving the vehicle. It is to be recognised that if the internal combustion engine of the vehicle is equipped with a fuel injection system then the other end of the inner member 11a of the Bowden cable will be attached to the equivalent of the throttle, that is to say the movable member controlling the amount of fuel supplied to the engine.

The outer member or casing of the Bowden cable is divided into first and second parts 11b, 11c. The part 11b is connected at one end to an anchor point 14 adjacent the accelerator pedal 12, and connected at its opposite end to the housing 16 of an actuator device 15. The other part of the Bowden cable outer member 11c is connected at one end to the housing 16 and at the opposite end to an anchor point 17 adjacent the throttle 13.

Within the housing 16 of the device 15 the inner member 11a of the Bowden cable extends around a pulley wheel 18. The axle of the pulley wheel 18 is carried by the output member 19 of a linear actuator 21 which in turn receives operating signals from an actuator controller 22 to which it is electrically connected. The actuator controller 22 is in turn controlled by a speed sensor 23 which monitors the speed of the vehicle and, in the event that the vehicle exceeds a predetermined speed, causes the actuator controller 22 to supply a signal to the linear actuator 21 to cause the actuator 21 to move its output member 19 outwardly, that is to say to increase the amount by which the actuator 19 protrudes from the casing of the actuator 21. With reference to Figure 1 therefore, the pulley wheel 18 is moved to the left when the speed of the vehicle exceeds a predetermined value.

It will be understood that while the output member 19 of the actuator 21 is stationary then

movement of the accelerator pedal 12 is transmitted directly by the cable inner member 11a to the throttle 13 and a 1:1 movement relationship exists between the pedal 12 and the throttle 13. Moreover, it will further be recognised that while the pedal 12 is held stationary the throttle 13 can be moved by moving the output member 19 of the actuator 21. For a given unit movement of the output member 19 there will be two units of movement of the throttle 13. Thus the effect of the pulley 18 coupling the output member 19 to the cable 11a is to provide a 1:2 movement ratio between the output member 19 and the throttle 13.

Assuming that the driver of the vehicle is accelerating hard and thus has the pedal 12 fully depressed. As the speed of the vehicle exceeds the predetermined value the actuator 21 will be operated to move the pulley 18 to the left through a given distance. The throttle 13 is of course spring urged to its engine idle position and thus as the pulley 18 moves to the left, the throttle 13 will be moved in a clockwise direction towards its engine idle position, and will move through a distance equivalent to twice the movement of the output member 19. Thus the throttle of the vehicle will move towards a closed position notwithstanding the fact that the driver is holding the accelerator pedal 12 fully depressed. As the speed of the vehicle falls below the predetermined value, the controller 22 will cause the actuator 21 to withdraw the member 19 thus opening the throttle 13 and permitting the vehicle speed to increase.

In the modification shown in Figure 2, a pivoted lever 28 fulfils the function of the pulley 19. The Bowden cable inner member 11a is cut, and one cut end is connected to one end of the lever 28, while the other cut end is connected to the other end of the lever 28. Intermediate its ends the lever 28 is pivotally mounted on the output member 19. The operation of the arrangement shown in Figure 2 is identical to that described with reference to Figure 1.

It will be recognised that the actuator device 15, controller 22 and sensor 23 can readily be fitted as an addition to an existing vehicle since in theory it is necessary only to apply the device 15 to the existing Bowden cable connection from the pedal 12 to the throttle 13. In practice it may be simpler to replace the existing cable with one already attached to the device 15 but this is not essential and may depend upon the vehicle in question. Moreover, when installed the device 15 is relatively tamper proof since the actuator 21 and cable inner member are

not exposed, being within the housing 16 which may be sealed in a manner to prevent unauthorized access.

## CLAIMS

1. A vehicle speed controller including a Bowden cable arrangement, the inner member of which is connected at one end to the accelerator control of the vehicle and at the other end to the throttle of the prime mover of the vehicle so that the throttle is moved in response to movement of the accelerator control, a vehicle speed sensor arrangement and an actuator, the output member of which is associated with said Bowden cable inner member and is caused to move, and in so doing by way of said Bowden cable inner member to move said throttle, in response to a signal received from said sensor arrangement.

2. A vehicle speed controller as claimed in claim 1, wherein said actuator output member is so associated with said Bowden cable inner member that provided that the accelerator control is stationary the movement ratio between said output member and said throttle exceeds 1:1 whereby said throttle moves further than said output member for a given movement of said output member.

3. A vehicle speed controller as claimed in claim 2, wherein said actuator output member is coupled to the Bowden cable arrangement by means including a pulley around which the Bowden cable inner member extends between the accelerator and the throttle, said movement ratio when the accelerator pedal is held against movement in use being 2:1.

4. A vehicle speed controller as claimed in claim 1 or claim 2 wherein said Bowden cable arrangement comprises a pair of Bowden cable parts and there is provided a lever pivotally connected intermediate its ends to the actuator output member, a first of said Bowden cable parts having its inner member coupled in use to the accelerator at one end and at its other end to one end of said lever, and the second of said Bowden cable parts having its inner member connected at one end, in use, to the throttle, and its other end connected to the other end of said lever.

5. A vehicle speed controller substantially as hereinbefore described with reference to Figure 1 of the accompanying drawings.

6. A vehicle speed controller as claimed in claim 5 modified substantially as hereinbefore described with reference to Figure 2 of the accompanying drawings.